

**Monday, January 16<sup>th</sup>**

- Begin Last Unit! Systems of Equations
- 3 methods: Graphing, substitution, and elimination
- Begin Review for Exam on Wednesday

Extra help offered at lunch hour Tuesday and Thursday

# Unit 3

## Systems of Equations

## "Systems of Linear Equations"

--a System is a set of 2 or more linear equations

### Solving a system of equations:

Calculate where the two equations are equal (the point where they would intersect).

### There are 3 ways to determine this point:

- a. The Graphing Method
- b. The Substitution Method
- c. The Elimination Method

## Graphing Method

$$y = mx + b$$

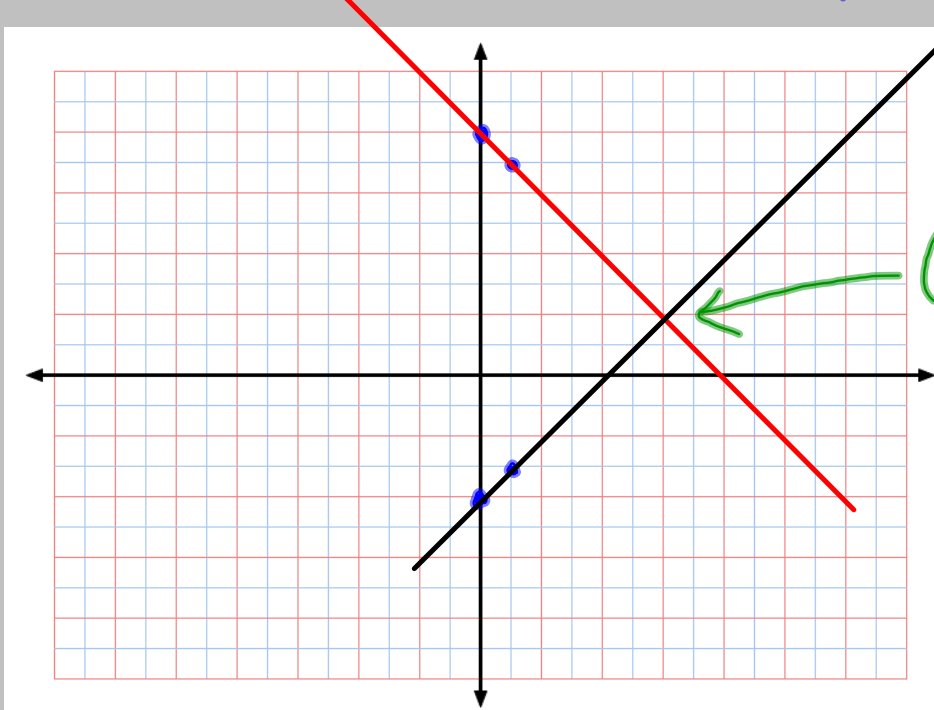
$$y + x = 8$$

$$y = -x + 8$$

and

$$y + 4 = x$$

$$y = x - 4$$



(6, 2)

ANSWER

At what point do the lines intersect?

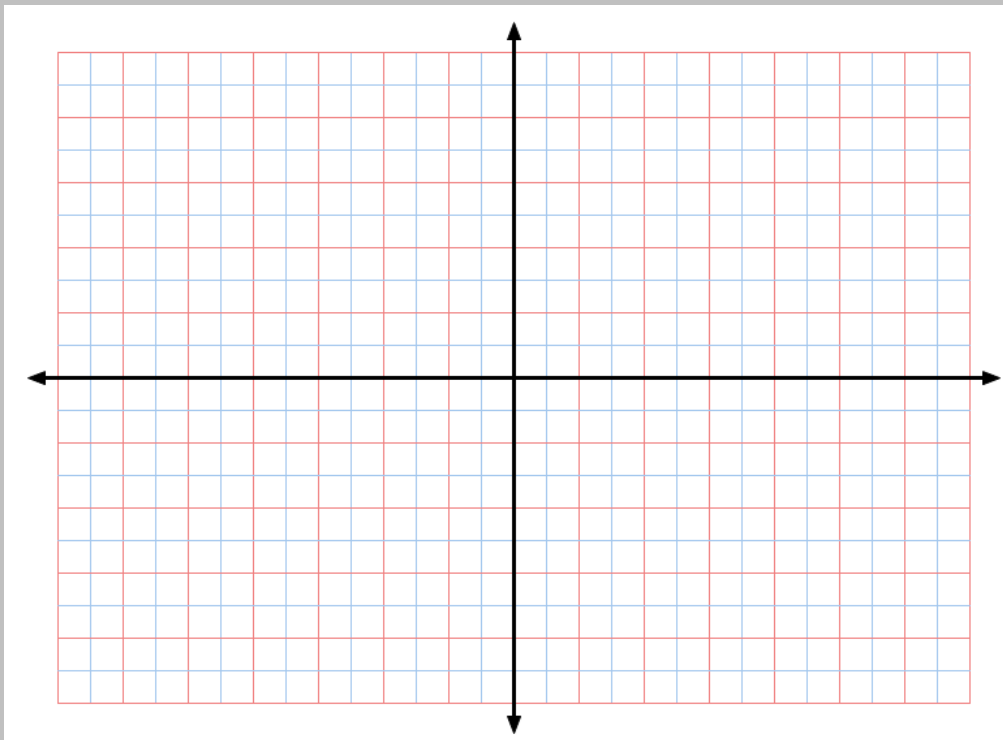
## Practice question

Solve the following system of linear equations using graphing

$$x + 1 = y$$

*and*

$$3 - x = y$$



## Solving Linear Systems by Substitution

Now we will look at the substitution method:

1. take one equation and isolate a variable
2. substitute that expression into the other equation and solve
3. substitute the answer into first equation, then solve for the remaining variable

**EXAMPLE 1- Solve the following system of linear equations.**

$$2x = y - 1$$

AND

$$-3 + y = 3x$$

STEP 1:  $2x = y - 1$

$$\begin{array}{r} 2x = y - 1 \\ +1 \quad +1 \\ \hline 2x + 1 = y \\ y = 2x + 1 \end{array}$$

Step 3

$$\begin{array}{l} y = 2x + 1 \\ y = 2(-2) + 1 \\ y = -4 + 1 \\ y = -3 \end{array}$$

Step 2:  $-3 + y = 3x$

$$\begin{array}{l} -3 + (2x + 1) = 3x \\ -2 + 2x = 3x \\ -2x \quad -2x \\ \hline -2 = x \end{array}$$

$(-2, -3)$

Practice Question: Solve the following system of linear equations using substitution:

$$3x + y = 2$$

AND

$$20x + 5y = 50$$

step 1:

$$\begin{array}{r} 3x + y = 2 \\ -3x \phantom{+ y} \\ \hline y = -3x + 2 \end{array}$$

step 3

$$\begin{array}{l} y = -3x + 2 \\ y = -3(8) + 2 \\ y = -24 + 2 \\ y = -22 \end{array}$$

step 2:

$$\begin{array}{l} 20x + 5y = 50 \\ 20x + 5(-3x + 2) = 50 \\ 20x + (-15x) + 10 = 50 \end{array}$$

$$\begin{array}{r} 5x + 10 = 50 \\ -10 \phantom{+ 5x} \\ \hline 5x = 40 \end{array}$$

$$\begin{array}{r} 5x = 40 \\ \div 5 \\ \hline x = 8 \end{array}$$

$$(8, -22)$$

**Practice Question:** Solve the following system of linear equations:

$$2x + y = 4$$

**AND**

$$x + y = 2$$